

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Long Lake, Lake County
2102-F-21-R-48
2015



Figure 1. Long Lake, Lake County

Legal Description: T105-106N-R51-52W-Sec 1, 6, 31, 36

Location from nearest town: 3 miles west, 3 north and 1½ west of Chester, SD

Surface Area: 480 acres

Meandered (Y/N): yes

OHWM elevation: no data

Outlet elevation: no data

Max. depth at outlet elevation: 6 feet

Observed water level: 1 foot low

Contour map available (Y/N): yes

Watershed area: no data

Shoreline length: 11.5 miles

Date set: NA

Date set: NA

Mean depth at outlet elevation: 1.7 feet

Lake volume: 830 acre-feet

Date mapped: 1992

DENR beneficial use classifications: (6) warmwater marginal fish propagation, (7) immersion recreation, (8) limited-contact recreation, (9) fish and wildlife propagation, recreation and stock watering

Introduction

General

Long Lake is a natural lake named for its long, narrow shape. The lake gets most of its water from Buffalo Creek, which enters on the west end. The natural outlet is on the east end and eventually empties into Skunk Creek. The lake reached its highest recorded depth in 1986 at 9 feet, but when it was mapped in 1992, the maximum depth was only 6 feet.

Ownership of Lake and Adjacent Lakeshore Properties

Long Lake is listed as meandered public water in the State of South Dakota Listing of Meandered Lakes. The United States Fish and Wildlife Service (USFWS) owns about 350 acres of land adjacent to the lake with the remainder of the shoreline in private ownership.

Fishing Access

There are no boat ramps on Long Lake. However, small boats can be launched off shorelines on the north and south sides of the lake. The entire lake has been designated as a no-wake zone except during the months of July and August. There are many shore fishing locations available on the public lands.

Water Quality and Aquatic Vegetation

Water temperature was 27 °C (81°F) at the time of survey, while the Secchi depth measurement was only 33 cm (13 in). Beds of sago pondweed as well as cattail stands were observed (Table 1).

Table 1. Water temperature, Secchi depth and observations/comments on water quality and aquatic vegetation in Long Lake, Lake County, 2006-2015.

Year	Water Temp °C (°F)	Secchi Depth cm (in)	Observations/Comments (algae, aquatic vegetation, water quality, etc.)
2015	27 (81)	33 (13)	Sago pondweed and cattail
2014	22 (72)	28 (11)	No aquatic vegetation observed
2012	26 (78)	48 (19)	No aquatic vegetation observed

Fish Community

Long Lake has a simple fish community comprised of four species (Table 2). Black crappie, green sunfish, northern pike, walleye, and white sucker have been sampled in the past (Table 7).

Table 2. Fish species commonly found in Long Lake, Lake County.

<i>Game Species</i>	<i>Other Species</i>
Yellow Perch Black Bullhead Orange-spotted Sunfish	Common Carp

Fish Management

The primary fish management objective for Long Lake is to provide a source of yellow perch for stocking into other waters. Providing a yellow perch fishing opportunity is the secondary objective. Stocking is occasionally used in attempts to achieve these objectives (Table 4). However, frequent fish kills often thwart these efforts (Table 3).

Table 3. Fish kill history for Long Lake, Lake County.

<i>Year</i>	<i>Severity</i>	<i>Comments</i>
2011	Light	Minor winterkill of carp and a few perch
2010	Severe	Winterkill, no YEP found alive, some BLB and COC survived
2001	Severe	Winterkill, only 12 bullheads caught in test nets
1997	Severe	Winterkill – some small perch, bullheads and pike survived

Table 4. Stocking history for Long Lake, Lake County, 2006-2015.

<i>Year</i>	<i>Number</i>	<i>Species</i>	<i>Size</i>
2005	83,955	Yellow Perch	Fingerling
2010	17,350	Yellow Perch	Juvenile
	50,810	Yellow Perch	Large Fingerling
2011	128,000	Yellow Perch	Small Fingerling

Methods

Long Lake was sampled on July 14-15, 2015 with three overnight gill nets. The gill nets were 45.7 m long x 1.8 m deep (150 ft long x 6 ft deep) with one 7.6 m (25 ft) panel each of 13, 19, 25, 32, 38 and 51-mm-bar-mesh ($\frac{1}{2}$, $\frac{3}{4}$, 1, $1\frac{1}{4}$, $1\frac{1}{2}$, and 2 in) monofilament netting.

Results and Discussion

Net Catch Results

Yellow perch comprised the majority the gill-net catch in 2015 (Table 5). Black bullhead, common carp, orange-spotted sunfish, and one walleye were also sampled. Since walleye have not been stocked, it is assumed this was an illegal introduction.

Table 5. Total catch from three overnight gill nets set in Long Lake, Lake County, July 14-15, 2015.

<i>Species</i>	<i>#</i>	<i>%</i>	<i>CPUE</i> ¹	<i>80% C.I.</i>	<i>Mean CPUE*</i>	<i>PSD</i>	<i>RSD-P</i>	<i>Mean Wr</i>
Yellow Perch	208	53.6	69.3	<u>+8.0</u>	42.6	47	32	93
Black Bullhead	127	32.7	42.3	<u>+18.0</u>	90.1	37	0	--
Common Carp	46	11.9	15.3	<u>+11.6</u>	24.4	50	9	--
O. S. Sunfish	6	1.5	2.0	<u>+2.6</u>	1.8	--	--	--
Walleye	1	0.3	0.3	<u>+0.4</u>	0.3	--	--	--

*10 years (2006-2015)

Table 6. CPUE by length category for selected species sampled with gill nets in Long Lake, Lake County, July 14-15, 2015.

<i>Species</i>	<i>Substock</i>	<i>Stock</i>	<i>S-Q</i>	<i>Q-P</i>	<i>P+</i>	<i>All sizes</i>	<i>80% C.I.</i>
Yellow Perch	--	69.3	37.0	10.3	22.0	69.3	<u>+8.0</u>
Black Bullhead	--	42.3	26.7	15.7	--	42.3	<u>+18.0</u>
Common Carp	8.0	7.3	3.7	3.0	0.7	15.3	<u>+11.6</u>
O. S. Sunfish*	--	--	--	--	--	2.0	<u>+2.6</u>
Walleye	--	0.3	0.3	--	--	0.3	<u>+0.4</u>

*No length categories established. Length categories can be found in Appendix A.

Table 7. Gill-net CPUE for selected fish species sampled in Long Lake, Lake County, 2006-2015.

<i>Species</i>	<i>2006</i>	<i>2007</i>	<i>2008</i>	<i>2009</i>	<i>2010</i>	<i>2011</i>	<i>2012</i>	<i>2013</i>	<i>2014</i>	<i>2015</i>
Black Bullhead							130.3		97.7	42.3
Black Crappie							0.3		--	--
Common Carp							31.3		26.7	15.3
Green Sunfish							0.7		--	--
O. S. Sunfish							0.3		3.0	2.0
Walleye							0.3		0.3	0.3
Yellow Perch							50.7		7.7	69.3

¹ See Appendix A for definitions of CPUE, PSD, RSD, RSD-P and mean Wr.

Yellow Perch

Management Objectives

- raise yellow perch for stocking other South Dakota waters
- provide occasional yellow perch fishing opportunity

Management Strategies

- stock yellow perch eggs, fry, small fingerlings or adults as needed to achieve the management objectives
- conduct annual fish population surveys and report the results to inform anglers of potential fishing opportunity

In 2015, yellow perch abundance rose substantially (Table 8) and over half of the fish sampled were stock to quality length (Figure 2). Since no stocking has been done in the last 4 years (Table 9), these fish were naturally produced. The gill net catch also included good numbers of fish in the 20-25 cm (8-10 in) length category as well as the 25-30 cm (10-12 in) category (Figure 2). High yellow perch abundance combined with a good size distribution should provide some excellent fishing opportunity, especially in the winter.

Table 8. CPUE, PSD, RSD-P, and mean Wr for all yellow perch sampled with gill nets in Long Lake, Lake County, 2006-2015. Stocked years are shaded.

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
CPUE							50.7	7.7	69.3	
PSD							10	22	47	
RSD-P							1	9	32	
Mean Wr							96	102	93	

Table 9. Yellow perch stocked into Long Lake, Lake County, 2006-2015.

Year	Number	Size
2010	17,350	Juvenile
	50,810	Large Fingerling
2011	128,000	Small Fingerling

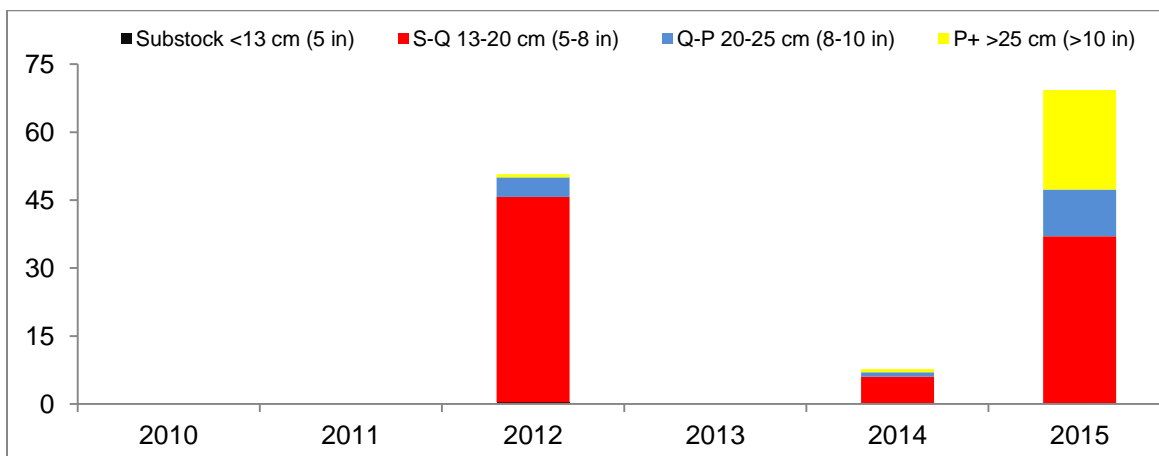


Figure 2. CPUE by length category for yellow perch sampled with gill nets in Long Lake, Lake County, 2010-2015.

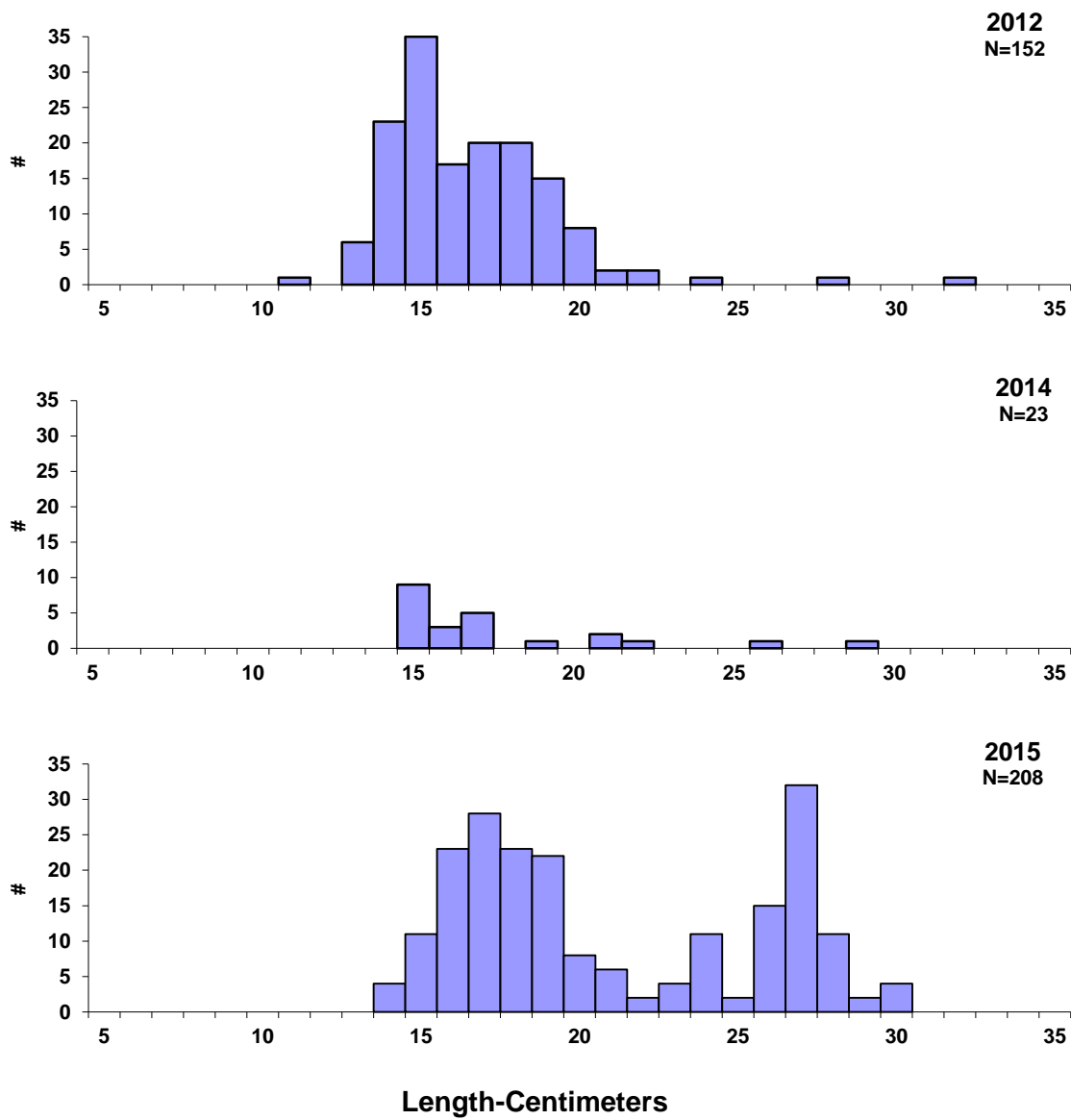


Figure 3. Length frequency histograms for yellow perch sampled with gill nets in Long Lake, Lake County, 2012, 2014, 2015.

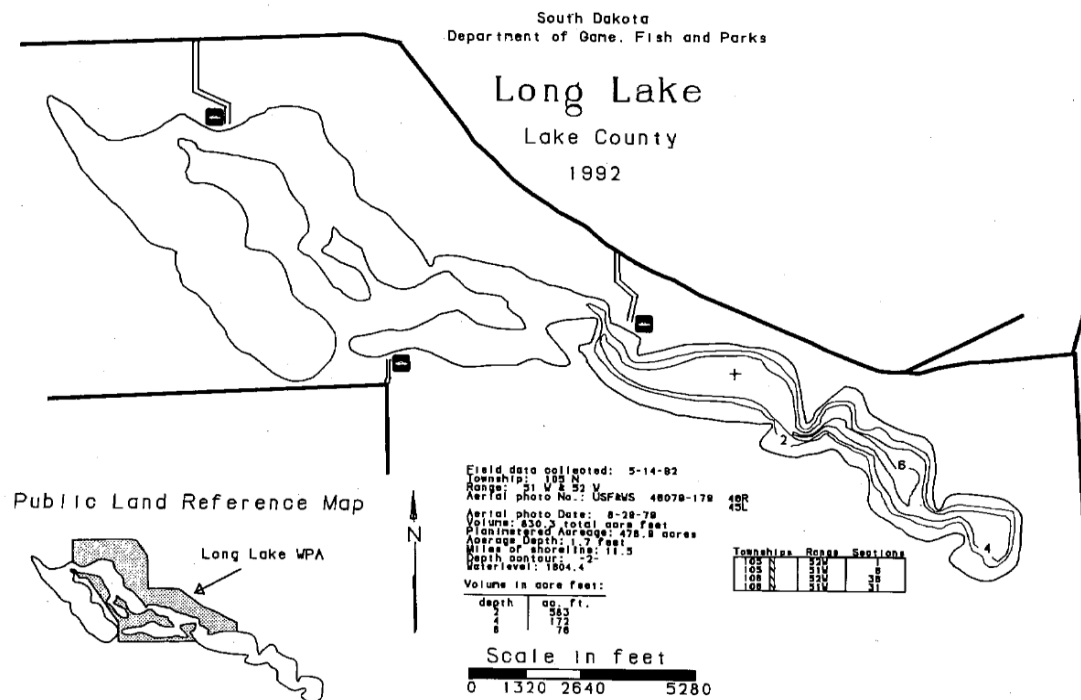


Figure 4. Contour map of Long Lake, Lake County.

Appendix A. A brief explanation of catch per unit effort (CPUE), proportional stock density (PSD), relative stock density (RSD) and relative weight (Wr).

Catch Per Unit Effort (CPUE) is the catch of animals in numbers or in weight taken by a defined period of effort. Can refer to trap-net nights of effort, gill-net nights of effort, catch per hour of electrofishing, etc.

Proportional Stock Density (PSD) is calculated by the following formula:

$$\text{PSD} = \frac{\text{Number of fish} > \text{quality length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

Relative Stock Density (RSD-P) is calculated by the following formula:

$$\text{RSD-P} = \frac{\text{Number of fish} > \text{preferred length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

PSD and RSD-P are unitless and usually calculated to the nearest whole digit.

Size categories for selected species found in Region 3 lake surveys, in centimeters (inches in parenthesis).

Species	Stock	Quality	Preferred	Memorable	Trophy
Walleye	25 (10)	38 (15)	51 (20)	63 (25)	76 (30)
Yellow perch	13 (5)	20 (8)	25 (10)	30 (12)	38 (15)
Black crappie	13 (5)	20 (8)	25(10)	30 (12)	38 (15)
White crappie	13 (5)	20 (8)	25(10)	30 (12)	38 (15)
Bluegill	8 (3)	15 (6)	20 (8)	25 (10)	30 (12)
Largemouth bass	20 (8)	30 (12)	38 (15)	51 (20)	63 (25)
Smallmouth bass	18 (7)	28 (11)	35(14)	43 (17)	51 (20)
Northern pike	35 (14)	53 (21)	71 (28)	86 (34)	112 (44)
Channel catfish	28 (11)	41 (16)	61 (24)	71 (28)	91 (36)
Black bullhead	15 (6)	23 (9)	30 (12)	38 (15)	46 (18)
Common carp	28 (11)	41 (16)	53 (21)	66 (26)	84 (33)
Bigmouth buffalo	28 (11)	41 (16)	53 (21)	66 (26)	84 (33)

For most fish, 30-60 or 40-70 are typical objective ranges for “balanced” populations. Values less than the objective range indicate a population dominated by small fish while values greater than the objective range indicate a population comprised mainly of large fish.

Relative weight (Wr) is a condition index that quantifies fish condition (i.e., how much does a fish weigh for its length). A Wr range of 90-100 is a typical objective for most fish species. When mean Wr values are well below 100 for a size group, problems may exist in food and feeding relationships. When mean Wr values are well above 100 for a size group, fish may not be making the best use of available prey.